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ecology of each were discussed as well as the morphology. The lecture on Sporozoa, which included a résumé of the life history of the malaria germ and other disease-producing Protozoa, was of unusual popular interest. In the sixth lecture Dr. Calkins discussed the renewal of vitality through conjugation, and the relation of conjugation to sexual reproduction of the Metazoa. The last lecture was devoted to a study of the Protozoan as a physiological machine, and was based largely upon the experimental work of recent years which has thrown so much light on the so-called 'vital' phenomena.

A point worthy of mention in connection with Dr. Calkins's lectures, since it contributed not a little to the value of the series, was the mode of illustration. For this purpose the stereopticon with microscope attachment was used, and photographic lantern slides, stained preparations and living Protozoa were thrown on the screen. Living Protozoa have often been thus projected, but in this case the highly perfected apparatus used rendered possible their projection on an unusual scale. *Amœba proteus*, for example, appeared five feet long, *Paramœcium aurelia* nearly four feet, so that many structures, nuclei, contractile vacuoles, etc., became plainly visible to a large audience. The stereopticon method proved especially valuable in demonstrating to large audiences the various 'tropisms' the positive and negative reactions, of certain Protozoa to chemical, electrical and other stimuli. By means of a specially devised electrical apparatus the lecturer was enabled to focus the projecting microscope from the lecture table.

Though the subject was a very special one, the mode of presentation and illustration was such as to render it highly interesting to the non-specialist, as was clearly shown by the large attendance at all the lectures.

J. H. MCG.

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THE BRITISH NATIONAL PHYSICAL LABORATORY.

THE Friday evening discourse at the Royal Institution, on May 24 was devoted to an account of the aims of the National Physical

Laboratory, by Mr. R. T. Glazebrook, its principal. According to the London *Times*, Mr. Glazebrook remarked that the idea of a physical laboratory, in which problems bearing at once on science and industry might be solved, was comparatively new; perhaps the first was the Physikalisch-Technische Reichsanstalt, founded in Berlin by the joint labors of Werner von Siemens and von Helmholtz, during the years 1883-87. It was less than ten years ago that Dr. Lodge outlined the scheme of work for such an institution in England, and in 1895 the late Sir Douglas Galton called attention to the question. A petition to Lord Salisbury followed, and as a consequence a Treasury Committee with Lord Rayleigh in the chair was appointed to consider the desirability of establishing a national physical laboratory. This committee examined over 30 witnesses and then reported unanimously, 'That a public institution should be founded for standardizing and verifying instruments, for testing materials and for the determination of physical constants.' It was now realized at any rate by the more enlightened of our leaders of industry that science could help them. This fact, however, had been grasped by too few in England, though our rivals in Germany and America knew it well; and the first aim of the laboratory was to bring its truth home to all, to assist in promoting a union which was certainly necessary if England was to maintain her supremacy in trade and manufacture, to make the forces of science available for the nation, to break down by every possible means the barrier between theory and practice, and to point out plainly the plan which must be followed unless we were prepared to see our rivals take our place. The effect of the close connection between science and industry on German trade might be illustrated, if illustration were wanted, by the history of the aniline dye manufacture and artificial indigo, and by the German scientific apparatus industry, the growth of which had been expressly attributed to the influence of the Reichsanstalt. Mr. Glazebrook proceeded to describe the means at disposal for realizing the aims of the laboratory. It was to be located at Bushey-house, Teddington, Kew Observatory remaining as the

observatory department. Bushey-house, in spite of its aristocratic history, would make an admirable laboratory. The building was very solid and substantial, and there was a good basement under the main central block with a roof of brick groining which afforded a very steady support for the floors above. The lecturer illustrated its plan with a number of slides, and compared it with the Reichsanstalt, which had an available space seven or eight times greater. But size alone was not an unmixed advantage, and personally he would prefer to begin in a small way if only he was in a position to do the work thoroughly. But there was a danger of starvation. Even with all the help the committee got in freedom from rent and taxes, outside repairs, and maintenance, the sum at its disposal was too small; £14,000 would not build and equip the laboratory, and £4,000 a year would not maintain it as it ought to be maintained. In America the Bill for the establishment of a laboratory which had just been passed authorized an outlay of £60,000 on buildings and site and an annual expenditure of £9,000. Was there no one who, realizing the importance of the alliance between science and industry, would come forward with more ample funds to start the laboratory with a fair prospect of success? Was there no statesman who could grasp the position and see that with double the income the chances of doing a great work would increase a hundred-fold? Give the institution means to employ the best men and it would answer the difficult problems it had to solve; starve it, and then quote its failure showing the usefulness of science applied to industry. In the concluding part of his lecture Mr. Glazebrook gave an account first of some problems of industry which had already been solved by the application of science, *e. g.*, glass for optical purposes, and then of some others which still remained unsolved and which the laboratory hoped to attack, *e. g.*, alloys, wind-pressure on bridges and similar structures, the exact determination of the relations between the scales of the mercury, hydrogen, and electrical resistance thermometers, and the magnetic testing of specimens of iron and steel, besides the standardization and calibration of various scientific instruments.

#### SCIENTIFIC NOTES AND NEWS.

AT the convocation exercises of the University of Chicago last week, a departure was made, in celebration of the tenth anniversary of the University, from the usual custom of not conferring honorary degrees. The LL.D. degree was conferred on ten men of eminence, including in the sciences, J. H. van't Hoff, professor of physical chemistry in the University of Berlin; Dr. A. Kovalevski, professor of zoology in the University of St. Petersburg; Dr. E. C. Pickering, director of the Harvard College Observatory; Dr. Charles D. Walcott, director of the U. S. Geological Survey, and Dr. E. B. Wilson, professor of zoology in Columbia University.

PROFESSOR A. S. PACKARD, who has held since 1878 the chair of zoology and geology at Brown University, has been elected a foreign member of the Linnean Society of London. The other American members of the society are: Alexander Agassiz, emeritus director of the Museum of Comparative Zoology, Harvard University; W. G. Farlow, professor of cryptogamic botany, Harvard University; D. H. Campbell, professor of botany, Stanford University, and C. O. Whitman, professor of zoology, University of Chicago.

AT its recent commencement Cornell College, Iowa, conferred the degree of LL.D. upon Mr. W. J. McGee, ethnologist, in charge of the Bureau of American Ethnology, Washington. Dr. McGee is of Iowa birth and education, and one of his most important works, a classic in glacial geology, is 'The Pleistocene History of Northeastern Iowa.' The honor thus comes with special propriety from an Iowa school.

M. BERTHELOT (Paris) was elected an honorary member of the Vienna Academy of Sciences on June 1, and the following corresponding members were at the same time elected: Professors Schlegel (Leyden), Oppert (Paris), Linde (Munich), Retzius (Stockholm) and Kovalevski (St. Petersburg).

AT the recent meeting of the Royal Society of Canada, Professor A. B. Macallum, of the University of Toronto, and Mr. Lawrence M. Lamb, of the Geological Survey of Canada,